ANALYSIS OF GREEN ACCOUNTING IMPLEMENTATION, ESG DISCLOSURE, PRICE TO BOOK VALUE AND THEIR IMPACT ON COMPANY PERFORMANCE IN THE MINING SECTOR FOR THE PERIOD 2022-2023

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Abstract

This study examines the extent to which green accounting implementation, Environmental, Social, and Governance (ESG) disclosure, and Price-to-Book Value (PBV) influence the financial performance of mining companies listed on the Indonesia Stock Exchange (IDX) during the 2022-2023 period. The sample consists of 10 mining companies, producing 20 firm-year observations. Using a quantitative approach with secondary data obtained from financial statements and sustainability reports, company performance is measured using Return on Assets (ROA). The empirical results indicate that green accounting (Sig. = 0.814), ESG disclosure (Sig. = 0.407), and PBV (Sig. = 0.735) do not have a significant partial effect on financial performance. Simultaneously, the three variables also do not significantly influence ROA (F = 0.310; Sig. = 0.818). These findings suggest that sustainability-related practices in Indonesia's mining sector have not yet produced measurable short-term financial benefits. However, they provide an early foundation for the integration of environmental and ESG principles into long-term strategic planning and corporate decision-making.

Keywords:
Green Accounting, ESG Disclosure, Price-to-Book Value, Financial Performance, Mining Sector, Indonesia.

1. Introduction

Sustainability and environmental responsibility have become major priorities in modern business operations, particularly in industries with high environmental impact such as the mining sector. Although mining activities are essential for Indonesia's economic growth, they often result in environmental degradation, deforestation, and pollution. These risks have intensified pressure from stakeholders including regulators, investors, and the public for mining companies to operate more responsibly and transparently.

To respond to these demands, the Indonesian government has strengthened sustainability regulations and promoted the adoption of Environmental, Social, and Governance (ESG) principles across industries. In line with this development, green accounting has emerged as a vital reporting approach that integrates environmental considerations into traditional financial statements. Through green accounting, companies can more transparently measure environmental costs and demonstrate a genuine commitment to sustainability.

Investor behavior in Indonesia has also shifted significantly. ESG scores and sustainability disclosures are increasingly considered as part of investment decision-making, reflecting a growing preference for companies perceived as environmentally responsible and better governed. At the same time, the Price-to-Book Value (PBV) ratio continues to serve as a key indicator of investor confidence, representing the market's perception of a company's growth prospects and overall value. Companies with strong ESG performance are often viewed as more resilient and financially sound, which may contribute to higher market valuation.

However, empirical findings regarding the impact of sustainability practices on company performance remain inconsistent. Several studies report that green accounting and ESG disclosure enhance profitability, reduce risk, and improve market value. In contrast, other studies find no significant or only partial effects, particularly in resource-intensive industries like mining. These inconsistencies create a clear research gap, especially concerning how green accounting, ESG disclosure, and PBV jointly influence financial performance within the Indonesian mining sector an industry that faces both high environmental scrutiny and increasing expectations for sustainability integration.

Therefore, this study aims to address these unresolved issues by analyzing the extent to which green accounting, ESG disclosure, and PBV affect company performance measured using Return on Assets (ROA) in mining companies listed on the Indonesia Stock Exchange (IDX) during the 2022-2023 period. By clarifying the relationship between sustainability-related practices and financial outcomes, this research contributes to the ongoing discourse on sustainable corporate behavior and provides empirical insights for stakeholders and investors in Indonesia's mining industry.

2. Literature Review and Hypotheses Development

1. Green Accounting

Green accounting is an accounting approach that integrates environmental costs into financial measurement and reporting. According to Gray et al. (2014), green accounting enables companies to identify the environmental impact of their operations and implement corrective actions that improve efficiency and reduce waste. Recent studies in emerging markets also show mixed findings: some find that environmental disclosure improves profitability and operational efficiency (Handayani et al., 2020), while others report no significant effect in high-impact industries such as mining (Dewi & Yasa, 2022). These inconsistencies indicate the need for further investigation, especially in Indonesia's mining sector where environmental risks are substantial.

H1: Green Accounting positively affects company performance.

2. ESG Disclosure

ESG disclosure reflects a company's commitment to environmental sustainability, social responsibility, and governance quality. Companies with higher ESG performance are considered to have lower operational risks and attract more long-term investors (Tjahjono & Diah, 2021). Empirical evidence, however, remains inconsistent. Some studies show ESG disclosure significantly enhances financial performance and market value (Putri & Sari, 2019), whereas others find neutral or insignificant effects, particularly in industries undergoing regulatory

transition (Susanto & Setiawan, 2018). This variation suggests that the impact of ESG practices may differ across sectors and stages of sustainability adoption.
H2: ESG Disclosure positively affects company performance.

3. Price-to-Book Value (PBV)
Price-to-Book Value (PBV) is a market-based indicator reflecting investor expectations about a company's future growth, management quality, and asset utilization. Brigham and Houston (2019) explain that a higher PBV indicates stronger market confidence. Empirical findings in emerging markets show that PBV is frequently associated with profitability and investor demand (Rahmawati & Prabowo, 2020), although the strength of this relationship varies depending on industry characteristics and market conditions.
H3: PBV positively affects company performance.

4. Synthesis and Research Gap
Although green accounting, ESG disclosure, and PBV have been widely examined, prior findings remain inconsistent particularly in the mining sector, which faces high environmental scrutiny but also contributes significantly to Indonesia's economic growth. Many previous Indonesian studies focus on manufacturing, banking, or general sectors, leaving the mining industry understudied. Additionally, limited research combines green accounting, ESG disclosure, and PBV within a single model, especially using recent post-pandemic data (2022–2023).
Thus, this study contributes to the literature by:

1. Focusing specifically on Indonesia's mining sector, a high-impact industry with unique sustainability challenges.
2. Using recent data (2022–2023) during a period of rising ESG adoption.
3. Examining three variables simultaneously to provide a more comprehensive understanding of sustainability and market perception in shaping financial performance.

Based on the theoretical basis and empirical inconsistencies, the overall relationship among variables is hypothesized as follows:
H4: Green Accounting, ESG Disclosure, and PBV simultaneously affect company performance**.**

3. Research Methodology

This study employs a quantitative research design with a descriptive and causal approach. The research aims to examine the influence of Green Accounting, ESG Disclosure, and PBV on the financial performance of mining sector companies listed on the Indonesia Stock Exchange (IDX).

Population and Sampling
The population consists of 47 mining companies listed on the IDX as of 2023. Using a purposive sampling technique, the following criteria were applied:

1. Companies consistently listed on the IDX during 2022–2023.
2. Companies that published sustainability reports in both years.
3. Companies with complete financial statements and available market value data for the research period.

Based on these criteria, 10 companies were selected, producing a total of 20 firm-year observations (10 companies × 2 years).

Variables and Measurements

• Dependent Variable: Company Performance (Y)

Measured using Return on Assets (ROA), calculated as net income divided by total assets (ratio scale).

• Independent Variables:

(a) Green Accounting (X_1)

Measured using an environmental disclosure index based on GRI Environmental Indicators. Each item is coded:

- 1 = disclosed
- 0 = not disclosed

The index is calculated as the proportion of disclosed items to the total indicators assessed.

(b) ESG Disclosure (X_2)

Measured using an ESG scoring rubric through content analysis of sustainability reports. Each ESG item is assigned 0–1, and the final ESG score represents the total disclosed items divided by total ESG criteria.

(c) Price-to-Book Value (PBV) (X_3)

Calculated using the formula:

PBV = Market Price per Share/Book Value per Share

Data Sources and Collection Technique

Data were collected using the documentation method, sourced from:

• Annual reports and audited financial statements

• Sustainability reports

• Market statistics and issuer disclosures from the IDX official website

All data were verified and coded into a structured quantitative dataset.

Data Analysis Technique

Data analysis consisted of the following steps:

1. Descriptive statistics to describe the distribution and characteristics of each variable.
2. Classical assumption tests, including:
   • Normality test
   • Multicollinearity test using VIF (VIF > 10 examined for interpretation)
   • Heteroskedasticity test
3. Multiple linear regression to test both partial and simultaneous effects of the independent variables on ROA.

The regression model used in this study is expressed as:

$ROA=\alpha+\beta 1GA+\beta 2ESG+\beta 3PBV+\varepsilon$

This equation summarizes the expected relationships between Green Accounting (GA), ESG Disclosure (ESG), PBV, and company performance.

4. Result

Descriptive Statistics Overview

The descriptive statistics in Table 1 indicate average scores of 0.68 for Green Accounting, 0.707 for ESG Disclosure, 1.441 for PBV, and 6.0415 for ROA, pointing to moderate levels of sustainability adoption and profitability within the sampled firms.

ESG Disclosure exhibits the lowest variability (standard deviation of 0.02227), implying consistent practices across companies, whereas ROA's greater fluctuation (standard deviation of 0.40010) highlights diverse profitability outcomes in the mining industry.

Diagnostic tests affirm data normality (as shown in Figure 1) and the absence of heteroskedasticity, though multicollinearity (with VIF values above 10) suggests interdependencies among predictors, which could compromise model stability.

Interpretation of Findings and Variable Insignificance

The lack of significance for Green Accounting (Sig. = 0.814), ESG Disclosure (Sig. = 0.407), and PBV (Sig. = 0.735) in affecting ROA reveals a short-term gap, where sustainability efforts generate initial expenses (such as compliance audits) that diminish immediate earnings without delivering rapid financial rewards.

In the context of Indonesia's mining sector, this insignificance likely arises from inadequate regulatory enforcement (for instance, uneven implementation of environmental regulations by the Ministry of Energy and Mineral Resources), enabling firms to engage in superficial green practices, as observed in earlier studies like Sari et al. (2018) on ESG hurdles in developing markets.

When critically compared to existing literature, international meta-analyses (e.g., Friede et al.,2015)frequently identify positive ESG-ROA associations in stable economies, yet Indonesia's commodity price volatility and corruption concerns (e.g., Pratama and Supriyadi, 2020) weaken these effects, in contrast to Western settings where robust institutions hasten advantages.

PBV's lack of impact emphasizes market-influenced shifts linked to international prices (e.g., coal demand), which eclipse internal sustainability efforts, diverging from advanced markets (e.g., Jensen,1993)where valuation measures align more tightly with operational results.

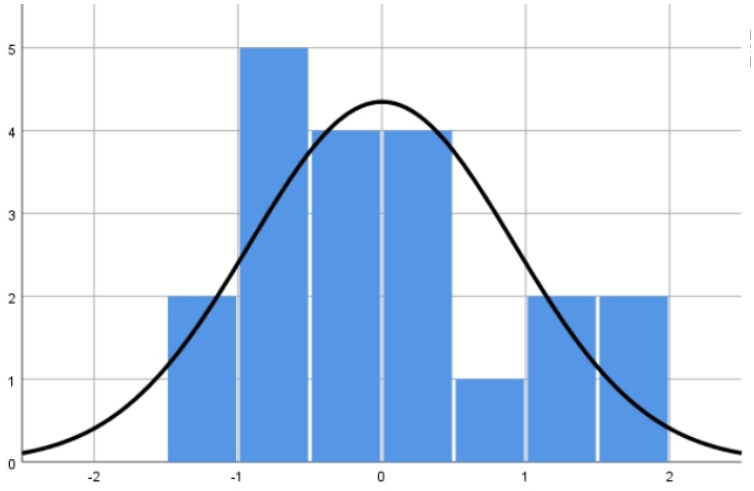
Overall, the F-test (F = 0.310, Sig. = 0.818) indicates that the combined influence of these variables is negligible in the near term, prompting a focus on long-range views in Indonesia's resource-reliant economy.

Model Robustness and Contextual Insights

Even with multicollinearity present, the model's diagnostics uphold its validity, with results stressing that sustainability indicators demand extended timeframes to impact ROA in mining operations. This analysis fills gaps in the literature by illustrating how Indonesia's distinctive challenges (such as environmental harm and familial ownership structures) postpone ESG returns, recommending tailored approaches over one-size-fits-all frameworks.

Table 1. Descriptive Statistics

Variable	N	Mean	Std. Dev	Min	Max
Green Accounting (X1)	20	.6800	.02920	.62	.73
ESG Disclosure (X2)	20	.7070	.02227	.67	.75
Price to Book Value (X3)	20	1.4410	.11765	1.25	1.70
Kinerja Keuangan (ROA)	20	6.0415	.40010	5.40	6.84
Valid N (listwise)	20			.	



Series: Standardized Residuals
Sample 2022-2023
Observations 20

Mean	0.3415
Median	0.2750
Maximum	18.000
Minimum	-12.500
Std. Deviation	0.9276
Skewness	0.1234
Kurtosis	25.621
Jarque-Bera	0.6418
Probability	0.7256

Figure 1. Normality Test

5. Discussions and Conclusions

Practical/Managerial Implications for Mining Companies

Integrate green accounting practices gradually to balance short-term costs with long-term benefits, such as improved resource efficiency and reduced environmental liabilities.

Enhance ESG disclosure through regular reporting to build stakeholder trust and reputation, even if immediate ROA impacts are not evident.

Monitor PBV trends closely and align internal sustainability efforts with market expectations to mitigate volatility from external factors like commodity prices.

Invest in training and systems for continuous ESG monitoring to foster innovation and operational resilience in the mining sector.

Implications for Regulators

Develop incentives or subsidies for mining companies adopting green accounting and ESG practices to offset short-term costs and encourage compliance.

Enforce stricter reporting standards for environmental metrics to ensure transparency and reduce regulatory risks for the sector.

Collaborate with international bodies to stabilize global commodity prices and investor sentiment, indirectly supporting PBV stability.

Promote policies that reward long-term sustainability, such as tax breaks for ESG-compliant operations, to drive sector-wide resilience.

Implications for Investors

Prioritize long-term investment horizons when evaluating mining stocks, focusing on ESG metrics beyond short-term ROA to identify companies with sustainable growth potential.

Diversify portfolios to account for PBV fluctuations driven by external factors, using ESG disclosures as a filter for socially responsible investments.

Engage with mining companies to demand transparent green accounting reports, influencing better governance and reducing perceived risks.

Support initiatives that align investor sentiment with intrinsic performance, such as sustainable investment funds targeting Indonesia's mining sector.

6. Limitations of Research

Sample Size Limitation: The study relies on a small sample of 20 firms, which restricts statistical power and may introduce sampling bias, particularly in a diverse sector like Indonesia's mining industry where firm sizes and regions vary widely. To address this, future research should expand the dataset to at least 100 firms using random or stratified sampling techniques across multiple provinces, enabling advanced analyses like structural equation modeling to confirm ESG impacts and provide more reliable benchmarks for industry-wide sustainability adoption.

Sector Limitation: Focused solely on the mining sector, the findings may not generalize to other industries with different environmental footprints or regulatory pressures, potentially overlooking sector-specific nuances in sustainability outcomes. Future studies should incorporate comparative analyses across multiple sectors (e.g., manufacturing, energy, and agriculture) using cross-sectional data, allowing for insights into tailored ESG strategies that could inform inter-sector policy transfers and enhance overall economic resilience in Indonesia.

Observation Period Limitation: The short timeframe of 2022–2023 captures only immediate effects, failing to account for lagged benefits of sustainability practices amid economic volatility, such as post-pandemic recovery or commodity price swings. To overcome this, researchers should extend the observation period to five years or more (e.g., 2019–2024) with longitudinal designs, including time-series forecasting to track causality and offer concrete timelines for when ESG initiatives yield measurable ROA improvements in mining contexts.

Variables Limitation: The exclusion of key control variables (e.g., firm size, leverage, ownership concentration, and environmental fines) may confound results, as these factors could mediate the relationship between sustainability metrics and financial performance. Future research should integrate these variables into multivariate models, such as moderated regression, to isolate effects and provide actionable recommendations, like using leverage ratios to guide financing decisions for green investments, directly supporting firms in balancing sustainability with profitability.

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